James Smith.

James Smith.

AN

ESSAY,

OR

PRACTICAL INQUIRY

CONCERNING THE

HANGING & FASTENING

OF

GATES AND WICKETS.

WITH PLATES.

AN

ESSAY,

OR

PRACTICAL INQUIRY

CONCERNING THE

HANGING & FASTENING

OF

GATES AND WICKETS.

WITH PLATES.

By THOMAS N. PARKER, Esq. M. A.

"*Studium quibus arva tueri.*"
VIRG. GEOR. I. 21.

London:

Printed by J. WHITING, at the CICERO PRESS, Finsbury Place, for
LACKINGTON, ALLEN, & Co. Temple of the Muses,
FINSBURY SQUARE.

1801.

(Price Two Shillings.)

Lately Published, MILITARY FIGURES, adapted for a single Troop of Cavalry, exercising independently. And also INFANTRY FIGURES, adapted for a single Company, &c. by THOMAS N. PARKER, Esq. Major-Commandant of the Brimstree Loyal Legion.

Sold at T. EGERTON's, Military Library, Whitehall.
Price 13s. each.

CONTENTS.

AN

ESSAY, &c.

CHAP. I.

Introductory Observations.

WHILE ingenuity is wont to employ itſelf excluſively in the more abſtruſe reſearches of art and ſcience, the economy and convenience of that which is of daily neceſſity is leſs regarded and ſlow of improvement, although the moſt important concerns are dependent upon, and oftentimes made up of, ſuch as are individually of ſmall notoriety. Thus may the ſubject of theſe pages appear at the firſt view to be of a frivolous nature, but it actually involves conſequences of conſiderable moment.

The miſchief committed by the treſpaſs of cattle, in devouring and trampling under foot crops which had been deſtined for the ſickle or the ſithe, is not eaſily to be calculated; for the occupiers of land grow callous to loſſes which are familiar to them, as the magnitude of an evil becomes leſs obvious by the frequency of its recurrence.

The perſeverance and ſucceſs with which horned cattle and horſes aſſail the hinges and latches of gates or wickets muſt be readily admitted; and were the boundaries of farms as well as fields better preſerved, it would promote good neighbourhood, and partly ſuperſede the uſe of pounds for cattle, wherein beaſts are confined and half ſtarved to expiate the folly of their owners.*

What I now offer to the public has afforded me much amuſement, and though I cannot but be ſenſible of a great want of arrangement in my manner of treating this ſubject, yet I found it a much eaſier taſk for me to take the parts nearly in the order in which they preſented themſelves: and this perhaps may be as acceptable to the generality of my readers, as if they were reduced into a more ſcientific form, in attempting which I ſhould be more likely to obſcure than elucidate what I have undertaken.

* My attention was firſt engaged in this inquiry by having no leſs than ſix gates in the carriage road through the centre of a highly cultivated farm, from the lodge to the houſe where I now reſide, and two more from thence to the ſtables.

CHAP. II.

The Principles of Hanging Gates and Wickets considered.

A GATE, when ſuſpended by hinges, is a lever of the ſecond kind, in which the weight is placed between the power and the fulcrum; for it is evident, that the hand applied to the head of the gate is the acting power, that the gate itſelf is the weight to be raiſed or moved, and that the hinges are the fulcrum or centre of motion.

When the hooks or pivots upon which a gate is hung are preciſely in the ſame perpendicular line with each other, the gate will be at reſt wherever it may be placed; and the ſame power which is required to move a gate thus ſuſpended through any given arc of the circle, will be exactly ſufficient to bring the gate back to its former poſition; in proof of which I would inſtance a common door to a room with plain hinges. But *the ſmalleſt variation of the hooks from their perpendicular line, will attach to a gate ſo ſuſpended one determinate*

minate line of rest, and no other; and from any part of the circle which the gate may be made to deſcribe, it muſt have a conſtant tendency to fall to that line of reſt. *

The line of reſt for a gate will always be where the head of the gate approaches neareſt to the ground, and from thence being moved half a circle to the right or left, it will there attain its greateſt height and ſupport itſelf, or with a very ſlight aſſiſtance may be ſupported in equilibrio.

When a gate is in its line of rest, or in its oppoſite line of equilibrium, the two hooks by which it is suspended, and the centre of the gate's gravitation, will be found to be in one and the same vertical plane: which will be eaſily underſtood by obſerving a common gate, whoſe hinges may be put on in any manner, however awkward or perverſe. And when the hooks are in a perpendicular line

* This opens a wide field to the wheel-wright for the exerciſe of his judgment, as in determining that variation, he may direct his hammer through all the *points of the compass*, till he gains by accident what ſhall ſeem to anſwer his purpoſe: and were you minutely to obſerve the operation of hanging a gate, you would often believe, that the practitioner was trying an experiment, rather than purſuing any regular method.

with

with each other (ſee page 3) it can admit of no doubt that they muſt always be in the ſame vertical plane with the centre of the gate's gravitation, becauſe they will be ſo with any third given point whatſoever.

CHAP. III.

The foregoing Principles further considered, and practically applied.

LET the hooks belonging to the hanging poſt G, plate III, which are put on in a common manner, be repreſented by the two ſpots near the hanging poſt; and it appears that the gate's line of reſt will be beyond the falling poſt g, and conſequently the gate will not meet the falling poſt in an upright poſition, but inclined; and unleſs the falling poſt is inclined alſo, to anſwer the defect in the manner of hanging the gate, the jar acting principally upon the upper part of the head of the gate muſt neceſſarily looſen the mortiſes and materially injure the gate itſelf. This however ſuppoſes the thimbles to be put on in the common manner, that is, any where in the ſame plane with the gate's extenſion in length or height; tho' by placing the two thimbles in a line which may form a proportionate angle with a perpendicular line, the gate may be ſo managed (though not without ſome difficulty) as to preſent itſelf upright, and its bars horizontal in any one part of its circuit, however diſtant from the line

line of reſt; and an inſtance of this may be ſeen in every ſwing gate that is hung in the common method*

The ſame obſervations will apply ſtill more ſtrongly in the caſe of H h, plate III, in which the gate being opened to the quarter circle, its head will there arrive at its greateſt elevation, and from thence will have an equal tendency to fall to the right or left, to ſhut itſelf or become wide open; and as the gate muſt generally be opened further than the quarter circle, the inconvenience of its remaining ſo would often occur, except perſons in uſing the gate were more careful than might be expected; and this is what we have principally to guard againſt in reſpect to road gates. I i, plate III, repreſents the manner of hanging a gate herein recommended, the merits of which are more fully explained hereafter.

K k, plate III, repreſents a ſwing gate hung in the uſual manner, having one hook at the top, and what is equivalent to two hooks or two pivots at the bottom. If this gate were to be obſtructed in its ſwing, and made to open only one way,

* See K k, plate III.

per fall to the gate is, the diſtance between the two thimbles; for the further theſe points of ſuſpenſion are from each other, in the ſame proportion ought to be the extra length of the lower thimble, as thus:

Suppoſe the diſtance of the two thimbles ſhall be 36 inches; one inch extra length of the lower thimble will be ſufficient, as appears by my table (page 30;) but the upper thimble will always draw forwards, while the lower thimble preſſes backwards, for which I allow one quarter of an inch.

If you require the proper extra length for a lower thimble, which is to be 40 or 20 inches from its upper thimble, you will find it as follows, by their proportion to the above:—as $36 : 1\frac{3}{12} :: 40 : 1\frac{4}{12}$; or as $36 : 1\frac{3}{12} :: 20 : \frac{9}{12}$. And as it will ſcarcely be poſſible, in common practice, to hang gates to a greater exactneſs than a twelfth part of an inch, I have omitted all ſmaller fractions; that is, the integer of one inch will in no caſe be divided into more than 12 parts, which I propoſe to make a general denominator for all broken numbers, as in the table, page 36.

The

The thimbles being ſcrewed into the gate, B D C, plate I,* their diſtance from each other will be about 40 inches in a common farming gate, and for which the extra length of the lower thimble ſhould be about $1\frac{4}{12}$ of an inch; but to make the models of general uſe, which will be more particularly mentioned afterwards, an iron waſher is added to each ſet to fit either the upper or lower thimble, and aſſiſted as it may be occaſionally with a waſher of ſheet-lead, or any thing elſe more eaſily to be met with will anſwer every purpoſe.

The gate-poſts and the gate being placed exactly upright, the hooks muſt then be driven in to anſwer the thimbles, as at H, plate I, allowing for the quarter of an inch loſt in the hanging; and if the hanging poſt is put up true, (with a plumb line, which ought always to be at hand in hanging a gate) the ſhoulderings of the hooks will ſhew how far they ſhould be driven in, and the ſpikes or ſhafts of the hooks will take a faſter hold of the poſt by not being much tapered. The upper hook G, and the lower hook I, plate I, are both alike, excepting that the latter is furniſhed with a key-hole

* All the drawings in the plates are upon a ſcale of $\frac{1}{12}$ of an inch to an inch, excepting where it is otherwiſe expreſſed.

and

and cotter, to ſecure the gate from being taken off the hinges. It is not uncommon to ſee one hook driven into the poſt with its point upwards, and the other with its point downwards, or *vice versâ*, which is a moſt effectual way of keeping the gate upon its hinges; but when the gate wants any repair, one of the hooks muſt be taken out to diſengage it from the poſt, and I would therefore give the preference to a cotter, which if made properly of tempered iron and hammered back to clip round the hook, it could not be removed without a hammer, and therefore not liable to fail in its uſe.

The hooks and the line of reſt for the gate, which includes its centre of gravitation, being in the ſame vertical plane, and this plane being parallel to and cloſe adjoining the gate-poſts, the real place of reſt for the gate will be where the gate is intended to be faſtened; and though it ſhall be quite upright when ſhut or at reſt, it will be nearer to the level of the ground there, than in any other part of its motion, as the gate will riſe gradually (a moderate force being applied to it) at the head till it has deſcribed the half circle; and the friction of the hinges at its line of equilibrium being overcome, it will fall of itſelf gradually from

from its greateſt elevation, though not with an uniformly accelerated motion as might be expected, but by a motion ſomewhat retarded when the gate rights itſelf, as it may be termed, in approaching towards its faſtening and line of reſt.

This may be more clearly explained by the diagram A, plate I, in which *a b c d* repreſent a gate nine feet long, and $4\frac{1}{2}$ feet high, and the riſe of the gate at the head when opened to the half circle will be in this proportion: *as the diſtance between the upper and lower thimbles is to double the clear extra length of the lower thimble;* (deducting the quarter of an inch loſt in hanging the gate;) *ſo will be the length of the gate, to the difference between the height of the head of the gate when at reſt, and the height of the head of the gate at its greateſt elevation, or in its oppoſite point of equilibrium:* that is, reducing it to inches as 40 : $2\frac{8}{12}$ :: 108 : $5\frac{4}{12}$, ſo that the head of the gate *a*, in deſcribing the half circle, will have riſen one quarter part of $5\frac{4}{12}$ inches at the point *l*, one half part, or $2\frac{8}{12}$ inches at *m*, three quarter parts at *n*, and $5\frac{4}{12}$ inches when it has completed the half circle at *o*. But this aſſumes that the gate is a right angled

angled parallelogram, ſo that the trueſt proportion would be this "*as the diſtance between the upper and lower thimbles*" *is to double the horizontal diſtance of two perpendicular lines, one falling from each of the hooks, ſo will be, &c. &c.* for ſhould the gate not be a right angled parallelogram, the heel of the gate at leaſt ought to be contrived ſo as in effect to be at right angles with the rail: the difference may be ſupplied by adding a waſher to the lower or upper thimble, as the caſe may require, and the proportion neceſſary will be found by the plumb line; but the real centres of the hinges are the hooks, though it may ſeem to ſuit my purpoſe to take the thimbles as the means of determining the other proportions.

Suppoſe a gate 9 feet long had ſunk in the wear one inch oppoſite the catch, or at the head, it may be put in order thus: try the hooks by a plumb line, and if they are out of their place, probably the hanging poſt has been drawn down by the weight of the gate, when it ſhould either be brought back to its upright poſition, or one of the hooks muſt be ſhifted; but if the gate has ſunk by its mortiſes giving way, then the

the remedy muſt be gained by adding a waſher to the lower thimble of about $\frac{1}{12}$ of an inch thick, becauſe as the ſinking of the gate at the head is to the length of the gate, ſo will be the clear diſtance of the thimbles from each other to the required additional length of the lower thimble, or as 108 : 1 : : 40 : $\frac{1}{12}$, and a waſher ſo added to the lower thimble muſt always be conſidered as a part of the gate, and not taken into any calculation in regard to the hooks ; for though the lower thimble would in this caſe exceed the upper thimble $1\frac{8}{12}$, "the horizontal diſtance of two perpendicular lines, one falling from each of the hooks," ſhould be no more than $1\frac{1}{12}$.

When the hooks have preſerved their place, the fall of the gate will be of equal power, whether the gate has, or has not ſunk by a failure in the mortiſes, or otherwiſe, as that cannot encreaſe the angle which the gate forms in its ſwing, with a line parallel to the horizon; but if the hooks have altered their poſition, it will generally have been occaſioned by the weight of the gate acting upon the hanging poſt, and the ſwing of the gate will then make a greater angle with a line parallel to the horizon, by which the gate's gravitation will

acquire an encreaſed force, upon the ſame principle that a body will deſcend faſter or ſlower upon an inclined plane, in proportion as the inclination of the plane may be greater or leſs; and this would be ſimilar in effect, as if the upper hook had originally projected ſo much beyond the lower hook, or to be more minute, as if "the horizontal diſtance of two perpendicular lines, "one falling from each of the hooks" had been as much greater than what is recommended by the table of proportion, page 30. Neither the poſition of the thimbles, nor the difference in their lengths, have any thing to do with the fall of the gate, any more than it may operate upon the friction of the hinges, yet by means of the thimbles being duly proportioned, and properly placed, the whole becomes adapted for uſe.

It would often require ſome aſſiſtance to counteract the friction of the hinges, were a gate to open to the full half circle; to obviate which, it is beſt to place a ſhort poſt or block, about one-eighth part of a circle within the point h, A plate I, high enough to meet the lower part of the gate, and the gate will always return with a motion rather accelerated near the quarter circle, though a little

little retarded as it approaches the line of reſt; the meaſure of its force being regulated to a medium for general uſe, but not ſo great as to reſiſt ſtrong winds. This power however may be encreaſed or diminiſhed, according to various opinions, by omitting or uſing the iron waſher; and the pattern for the lower thimble being made to exceed the upper one $1\frac{3}{12}$ inch, I would adviſe in all high gates to add the waſher to the lower thimble, and in low gates to omit it, which will be attended with ſufficient accuracy for common purpoſes.

All the iron work in my models is furniſhed with ſhoulderings, which ſhew how far each part is to be ſcrewed or driven into the wood; and I can diſcover no better general rule, as to the extra length of the lower thimble, than the one preſcribed; for the weight of a gate or wicket will always bear ſome proportion to its length, and, conſequently, what may be gained by the lever will be loſt in friction, and *vice versâ*.

To avoid the friction, or more particularly any binding of the hinges, the thimbles are made with rounded iron, and thoſe parts of the hooks which receive the thimbles are rounded alſo; and the upright

upright parts or pins of the hooks are of as ſmall a diameter as is conſiſtent with their ſtrength and durability: the hinges ſhould of courſe be kept oiled or greaſed, and as free from ruſt as poſſible.

I have taken great pains in having the moſt exact models prepared of the iron work recommended herein; ſets of which will be offered to the "Board of Agriculture," the "Society for the Encouragement of Arts, Manufactures, and Commerce," and to the Royal Inſtitution a ſet will alſo be left with my blackſmith, who has been employed in all my experiments, and with whom I have made a bargain for the public, and arranged the terms of his propoſals, to furniſh the iron work which I hope may be ſerviceable to him as well as his employers.

There are various ways of putting on the thimbles, and perhaps many of them are equally good; but the general objection is their extreme weight, which neceſſarily adds to their expenſe. I have given the preference to the ſcrew, as a very ſimple and firm faſtening for the thimbles, and which is particularly applicable to the nicety required as to the extra length of the lower thimble, becauſe any

any alteration may be as ſmall as half a turn of the ſcrew; and for that purpoſe the ſcrews are not tapered, leſt by having occaſion to draw them out a little, it might looſen their hold of the gate.

The ſame thimbles are equally ſuitable to a ſwing gate, as would be proper for a gate intended to open only one way; but the upper hook muſt exceed the lower one in length, in order to make good the difference between the upper and lower thimbles, (deducting the quarter of an inch loſt in the hanging) ſo that the pattern thimbles having $1\frac{3}{12}$ inch difference in their lengths, the pattern upper hook for a ſwing gate ſhould not exceed the lower hook in length more than one inch,* the lower hook being the ſame as I, plate I.

The ſubſtance of a gate-poſt ought to be from eight to ten inches ſquare; or, for very

* By the ſame rule, the two hooks driven into the poſt H, plate I, ſhould vary $1\frac{1}{12}$ of an inch in their perpendicular lines, though the thimbles belonging to them differ $1\frac{4}{12}$ from each other; the clear diſtance of the thimbles being ſuppoſed to be 36 inches in the one caſe, and 40 inches in the other.—See the Table of Proportion, page 30.

heavy

heavy gates, a foot ſquare would not be the large; and the ſteadineſs of a gate-poſt depends much upon the depth of its inſertion into the ground, which ought to be nearly equal to its height above: or the poſts may be kept in their places by ſtrong frame-work under ground.

In an ordinary gate of a moderate height, or when the hinges are about three feet or 40 inches diſtant from each other, the fall of the gate is calculated to depend upon a certain variation of only one inch, or 1 $\frac{1}{12}$ of an inch; and I cannot therefore impreſs too ſtrongly the neceſſity of uſing a plumb line, as the eye is not capable of ſufficient accuracy.

When a gate is to be hung afreſh, it will often be proper to move one or both of the gate-poſts, in which caſe the iron work may be fitted to one or both of the gate-poſts, as well as the gate, before they are fixed in the ground: the hanging poſt being put into its place, before you faſten it, the right poſition of the hooks may be found by one proof with the plumb line, that is, for a gate to open one way, let fall the plumb line from the point *a*, H, plate I, and for the ſwing gate from the point *a*, plate II; and if there ſhould be a ſmall difference

in

in the iron work, in meaſuring from the outſide edges of the hooks, inſtead of their centres, it will not exceed $\frac{1}{12}$ or $\frac{1}{12}$ of an inch, (if the hooks are well made) which may be allowed for.

Thus will the preciſe place of the hooks be determined by one obſervation only, but the plumb ought to be a ball or cylinder of lead, iron, or other metal, and half a pound weight at the leaſt; yet it is hardly neceſſary to mention that if any irregular ſubſtance were uſed inſtead of the ball or cylinder, the line would be apt to vary from a true perpendicular, in as much as the centre of gravity of ſuch a weight may be in a direction of either ſide of the line, inſtead of being exactly under it.

In a ſwing gate, the diſtance between the heel of the gate, and the neareſt edge of the hanging poſt, will be about five inches, after cutting away about one inch to let in the ſhouldering of the upper hook, as deſcribed, F plate II, to give it a good bearing; and as much more or leſs than one inch may be cut away to let in the lower hook, as will anſwer the difference required by hinges which are more or leſs than three feet aſunder: for inſtance, if the diſtance of the hinges ſhould be 40 inches, it would be

be neceſſary for the lower hook to be let into the poſt $\frac{1}{12}$ of an inch further than the upper one, or an extra blow or two with a heavy hammer, probably might effect what was wanted: and could a waſher be added to either of the hooks, as occaſion might direct, with equal ſucceſs, as in reſpect to the thimbles, it could not make a more complete job than the method propoſed.

The five inches between the hanging poſt and heel of the gate do not ſeem to the eye to be too great a diſtance, but were it thought otherwiſe, the hooks might be let in further, provided the gate were not wiſhed to open much wider than the quarter circle each way from its line of reſt. The head of a ſwing gate ſhould be two inches from the neareſt edge of the falling poſt, the double catch B C, plate IV, having been let into the edge of the poſt about half an inch; and the wood under the catch muſt be cut away to admit of the free action of the latch in the manner deſcribed by the dotted lines under the fore part of the latch E, plate II, and A plate III, about one inch and an half deep cloſe to the catch, and rounded off to nothing at about four inches below, to be determined by the action of the latch, allowing ſomething for the probability of the gate's ſinking. The

The difference of the diſtances between the hanging poſt with the heel of the gate, and the falling poſt with the head of the gate being as five inches to two, will not be greater than in ſwing gates, which are hung in the common manner, and has no appearance of any want of uniformity; for there will uſually be as great a difference in the ſubſtances of the heel and head of a gate, as there will be in their diſtances from the hanging and falling poſts reſpectively.

The poſts of a ſwing gate ſhould be placed edgeways, as at F and D, plate II, whereby the hanging poſt will allow the gate to open on either ſide, juſt as far as it ought to do, and no further; and having entered ſo fully into the general principles of gates, it will be ſcarcely neceſſary in this place to refer to L l, plate III.

In applying this principle to a turnpike gate, I would recommend that the upper and lower hinges of the ſwing gate ſhould have their places reverſed, or exchanged, which would adapt them very well to this purpoſe; for when the gate was faſtened, it would be quite upright, and the bars horizontal; but, upon unlocking it, it would fall open either to the right

or left, with the ſame power as a common ſwing gate would ſhut of itſelf, and remain open till it were brought back to its place, and ſhut by the ſame force as would open a common ſwing gate; which would be a great convenience to travellers, and prevent many accidents. When the gate thus hung was faſtened, it would, in effect, be the ſame as a common ſwing gate ſupported in its line of equilibrium, and by removing the faſtening, it would deſcend nearer to the ground in its fall, either to the right or left, though it ſtarted from the upright poſition.

The cotter, in all inſtances, had beſt belong to the lower hook, where it is moſt out of the way.

What is recommended in regard to gates, is almoſt in every reſpect applicable to wickets; only that the hinges ſhould be proportionately lighter.

Care muſt be taken in hanging a ſwing gate, that you chooſe the beſt ſide for it to open upon, in doing which, there are two circumſtances to be conſidered: the principal one is, that there may be convenient room for a ſervant

on

on horſeback to hold the gate while a carriage paſſes; and the other is to avoid its opening againſt any croſs-road or path.

The ſame rules will be neceſſary to be obſerved in regard to gates which are to open one way; and, in addition to which, ſome attention is due to the treſpaſs of cattle from the turnpike-road, or otherwiſe, in which it is thought more ſecure for a gate to open againſt that ſide from which the treſpaſs may be moſt apprehended; and, in ſome caſes, it may be adviſable to furniſh a hanging-poſt, with a pair of hooks on both ſides of it, that the gate may be ſhifted as occaſion may make it convenient.

I wiſh by no means to be underſtood, that the hangings of an old gate ſhould be thrown aſide as uſeleſs; for an old upper hook and thimble, in moſt inſtances, will anſwer nearly as well as any other, taking care that the lower thimble be lengthened out to the difference required; and if the lower hook is of a common form, it will only want to be put into a freſh part of the gate-poſt, and probably the upper hook alſo muſt be ſhifted; but, let the lower hinge be

what it will, it may be altered into the form preſcribed, however contrary to the opinion and intereſt of the blackſmith.*

Some ſwing gates which I have of the pattern A, plate III, have ſtrap thimbles, F, plate III, faſtened on with ſcrew-pins and nuts, which probably ſtrengthen them; the gates are rather light, in appearance at leaſt, though they weigh about 90lb, including the iron work; are nine feet long, and three feet eleven inches high. Amongſt the other advantages which belong to having the artificial and natural lines of reſt united, as by the method of hanging gates, which I have endeavoured to explain, is, that of their opening ſo very light in the hand, for a power of five or ſix ounces being applied at the latch of gate A, plate III, is ſufficient to throw it open wide enough to ride through on horſeback; and the return of the gate is ſo ſlow, but nevertheleſs ſo certain, that I ſhall ſpare no pains in recommending it to general notice.

In hanging a gate, the thimbles ſhould be firſt put

* I am alſo under ſome fear that the greateſt oppoſition to the *weight of my arguments* may be in the blackſmith's *weight of metal*; for their work being uſually ſold by the pound, gate hangings are often twice as heavy as they have need to be.

on

on and adjuſted; after which ſupport the gate againſt the hanging-poſt, and mark out the place for the upper hook. Having completed the upper hinge, the gate ſhould now be wedged up into its proper poſition, with ſome pieces of wood, brick, or ſtone, as may be neareſt at hand, proving it to be upright by the plumb line; the lower hook may be then driven into its place, not forgetting the quarter of an inch which will be loſt in the gate's ſuſpenſion.

The means which I think moſt favourable for introducing this improvement in gates is, for each perſon, who may think well of my ſuggeſtions, to procure one new gate at the leaſt, with new gate-poſts, to be hung in the beſt manner; and, taking that as a model, to alter and amend the old ones thereby, as far as may ſeem economical, and ſuitable to his particular purpoſes.

The common field gates admit of a material diſtinction from road gates in ſeveral reſpects; for, as to thoſe which are uſed very ſeldom, or are generally locked, it is of little conſequence, ſo that the fence is made complete, whether they ſhut of themſelves or not: and ſome people think that

that a light high gate is preferable to a low and heavier one; but I have heard a gate of about $4\frac{1}{2}$ feet high recommended for ſeveral reaſons, and particularly as a fence againſt horſes; becauſe the top rail would meet their wind-pipes inſtead of their cheſts, and being able to put their heads over it, they would be the leſs likely to force it with their rumps.

A gate opening out of a field into a public road, ſhould be ſuch as no one could eaſily get over, with upright pales for inſtance, ſharpened at at the top, and it might be higher than uſual: there is no objection to ſuch gates opening double, as folding doors, and I would prefer the hooks for hanging them to be perpendicular to each other, ſo that the gates ſhould remain wherever they might be placed; and no other faſtening ought to be allowed but a lock and key: this ſuppoſes that there is no common road or path through the field.

In very heavy lodge-gates, and turnpike-gates, I have ſeen the lower hinge contrived ſomething like D E, plate IV; a piece of iron let into a ſtone, with the top of the iron rounded and bevelled acutely

acutely towards a point, and a ſocket which may be faſtened to the heel of the gate with ſcrew-pins and nuts; and the ſocket is of courſe leſs acute than the bevel to be received, ſo that as little friction as poſſible may be occaſioned in opening the gate by the twiſt of the hinges, which in neither caſe will be perpendicular to each other. The pivot is well protected from rain and dirt in this manner, but I ſhould always prefer the common hooks and thimbles of a proper ſtrength; and if it were thought neceſſary, the gate might be in part ſupported by a ſmall roller or caſter placed under the heel.*

* I have alſo ſeen the lower hinge of a ſwing gate formed with four hooks, or pivots, the two middle ones being projected a little further from the hanging-poſt than the others, and the part attached to the gate indented to anſwer the hooks; but the ſame objections apply to this as to K k, plate III.

Table of Proportion in regard to Hooks and Thimbles, supposing a Gate to be a right angled Parallelogram, set forth in Inches and twelfth Parts of Inches.

Distance from Thimble to Thimble.	" Horizontal Distance of Two perpendicular Lines, one falling from each of the Hooks."	Extra Length of lower Thimble.	Distance from Thimble to Thimble.	" Horizontal Distance of Two perpendicular Lines, one falling from each of the Hooks."	Extra Length of lower Thimble.	Distance from Thimble to Thimble.	" Horizontal Distance of Two perpendicular Lines, one falling from each of the Hooks"	Extra Length of lower Thimble.
12	$\frac{4}{12}$	$\frac{7}{12}$	29	$\frac{9}{12}$	1	46	$1\frac{3}{12}$	$1\frac{6}{12}$
13	$\frac{4}{12}$	$\frac{7}{12}$	30	$\frac{10}{12}$	$1\frac{1}{12}$	47	$1\frac{3}{12}$	$1\frac{6}{12}$
14	$\frac{4}{12}$	$\frac{7}{12}$	31	$\frac{10}{12}$	$1\frac{1}{12}$	48	$1\frac{4}{12}$	$1\frac{7}{12}$
15	$\frac{5}{12}$	$\frac{8}{12}$	32	$\frac{10}{12}$	$1\frac{1}{12}$	49	$1\frac{4}{12}$	$1\frac{7}{12}$
16	$\frac{5}{12}$	$\frac{8}{12}$	33	$\frac{11}{12}$	$1\frac{2}{12}$	50	$1\frac{4}{12}$	$1\frac{7}{12}$
17	$\frac{5}{12}$	$\frac{8}{12}$	34	$\frac{11}{12}$	$1\frac{2}{12}$	51	$1\frac{5}{12}$	$1\frac{8}{12}$
18	$\frac{6}{12}$	$\frac{9}{12}$	35	$\frac{11}{12}$	$1\frac{2}{12}$	52	$1\frac{5}{12}$	$1\frac{8}{12}$
19	$\frac{6}{12}$	$\frac{9}{12}$	36	1	$1\frac{3}{12}$	53	$1\frac{5}{12}$	$1\frac{8}{12}$
20	$\frac{6}{12}$	$\frac{9}{12}$	37	1	$1\frac{3}{12}$	54	$1\frac{6}{12}$	$1\frac{9}{12}$
21	$\frac{7}{12}$	$\frac{10}{12}$	38	1	$1\frac{3}{12}$	55	$1\frac{6}{12}$	$1\frac{9}{12}$
22	$\frac{7}{12}$	$\frac{10}{12}$	39	$1\frac{1}{12}$	$1\frac{4}{12}$	56	$1\frac{6}{12}$	$1\frac{9}{12}$
23	$\frac{7}{12}$	$\frac{10}{12}$	40	$1\frac{1}{12}$	$1\frac{4}{12}$	57	$1\frac{7}{12}$	$1\frac{10}{12}$
24	$\frac{8}{12}$	$\frac{11}{12}$	41	$1\frac{1}{12}$	$1\frac{4}{12}$	58	$1\frac{7}{12}$	$1\frac{10}{12}$
25	$\frac{8}{12}$	$\frac{11}{12}$	42	$1\frac{2}{12}$	$1\frac{5}{12}$	59	$1\frac{7}{12}$	$1\frac{10}{12}$
26	$\frac{8}{12}$	$\frac{11}{12}$	43	$1\frac{9}{12}$	$1\frac{5}{12}$	60	$1\frac{8}{12}$	$1\frac{11}{12}$
27	$\frac{9}{12}$	1	44	$1\frac{9}{12}$	$1\frac{5}{12}$	61	$1\frac{8}{12}$	$1\frac{11}{12}$
28	$\frac{9}{12}$	1	45	$1\frac{9}{12}$	$1\frac{6}{12}$	62	$1\frac{8}{12}$	$1\frac{11}{12}$

CHAP. IV.

Faſtenings of Gates and Wickets.

ALMOST every blackſmith has ſome favourite notion for a gate faſtening, and the variety of them is now become ſo extenſive, that I muſt confine myſelf, with a few exceptions only, to ſuch as from the reſult of experiments and a due conſideration of their comparative merits, I ſhall venture to recommend.

The double drop catch D, plate II, has been uſed for ſome time in parts of Shropſhire and Staffordſhire, and this I took no ſmall pains to improve: I adapted it for fitting an angle of a poſt, of which G, plate II, is an horizontal ſection, and the ſcrew pin in the centre is made to anſwer two purpoſes; that of attaching the iron work more firmly to the poſt, and alſo of returning the points of the drop catches as often as either of them is driven upwards by the latch, the catch being thus inſtantly repulſed into its former poſition, before the gate has time to recoil beyond it.

This ſort of catch is calculated for a ſwing gate, which, having been opened either way, falls to its line of reſt, but is prevented from paſſing it by the obſtruction of one of the catches; while the other catch giving way for the latch, drops again, and the gate is completely faſtened.

I afterwards applied the ſame principle to a ſingle catch, for a gate to open only one way, K, plate I, in which I conceived that I had been very ſucceſsful.

It was next to be determined what kind of latch was moſt proper for theſe catches, and I found that the beſt contrivances for baffling cattle, were apt to puzzle my viſitors, whoſe convenience was entitled to a ſhare of my attention.

I at firſt tried an iron peg, E, plate I, to be driven into the head oppoſite the top rail, for a road gate, and when it was to be placed lower for a fold-yard, or common field gate, to be faſtened with a ſcrew nut, both of which are repreſented in F, plate I: I then found it neceſſary to add a handle to the drop K, plate I, but my friends would ſtill inſiſt upon it, that it was a *two-handed* faſtening,

faſtening, and very inconvenient for horſemen: I ſoon diſcontinued the iron peg, in regard to the double catch, though I approve of it for ſome purpoſes.

It certainly never can be opened by cattle, and I think it would be eaſy enough for a horſeman to open, when he became acquainted with it; yet ſhould he take faſt hold of the handle of the catch, with the fore part of the hand, as might be expected, in raiſing the drop, he will detach that hand from the gate, and he muſt then ſeek the aid of his other; though by placing the thumb or palm of the hand upon the drop catch, and reſerving the full liberty of his fingers, he may open the gate very well with one hand: but when the catch is upon the contrary ſide of the gate to that of the horſeman, it will not be quite ſo convenient, for the fingers or fore part of the hand muſt in that caſe be employed upon the catch, while the thumb opens the gate.*

A great advantage may be gained by having the iron peg guarded, as repreſented by A, plate II,

* There are perſons who do not immediately diſcover, that by pulling at the handle of this catch, they exert themſelves againſt the gate poſt inſtead of the gate.

or B, plate II, which will remove the objection to its being in any way dangerous; and while it facilitates the opening of the gate with one hand, it throws a freſh difficulty in the way of cattle.

But the iron peg latch would not anſwer for the ſwing gate, and I have ſupplied its place by the jointed latch A, plate III, the principle of which is not uncommon, and its ſeveral parts conſiſt of H, I, K, L, M, O, and P, plate II: the part O forms a moſt complete guard to the latch, and the handle being a ſemicircular ring, reſts upon the upper bar of the gate, or upon the ſecond bar E, plate II, making it extremely improbable that a cow or horſe could ever lift up a latch of this kind.

In E, plate II, the reſt for the latch is one of the bars of the gate, and its upright wire is guarded by being incloſed in a round bar of wood, ſimilar to the bars of the gate.*

For a ſwing gate the latch ſhould be placed as nearly as poſſible to the middle part of the head,

* C, plate II, repreſents a guard adapted for the jointed latch, when attached to a common gate, and was engraved before the guard O, plate II, was contrived, which has ſuperſeded every other.

that

that the gate may the better reſiſt the jar of its ſhutting; for the ſudden check, which the drop catches give to a ſwing gate, is greater than what is found in ordinary faſtenings; and if the latch were placed towards the top of the head of the gate, it would be as deſtructive as the common manner of hanging ſingle gates was deſcribed to be, pages 6 and 7.

Having finiſhed my drop catches, a friend aſſured me, that he had ſeen both ſingle and double catches in Suffolk upon the ſame principle, and at my requeſt, he procured me a very good ſketch of them, and alſo a ſort of model: as far as I could judge from the drawings of the Suffolk catches, they ſeemed rather to have the advantage of thoſe which I had firſt ſeen in Shropſhire.

In the courſe of an extenſive tour I made laſt ſpring, I took occaſion to obſerve, that however generally good methods of hanging and faſtening gates might be underſtood, they were very rarely practiſed; and I cannot help particularly noticing the gates acroſs the public roads in Dorſetſhire, which are very numerous, in ſupport of my aſſertion: and ſhould theſe hints ever find their way ſo far, I hope

hope that public as well as private convenience, in ſuch reſpect, may thereby be promoted.

I ſaw a catch, ſimilar to C, plate III, in Devonſhire, and the latch uſed with it was a kind of iron peg nailed to the inner ſide* of the top rail of the gate, and in effect like E, plate I; but there is an objection to any catch receiving the latch above the pivot upon which the catch turns: ſuch a faſtening, if the gate ſinks but a very little, will gradually become uſeleſs, which gives an undoubted preference to the other drop catches; as with them a gate muſt ſink two inches (which one that is well hung never ought to do) before the catch will ceaſe to act.

The double catch B, plate III, is uſed at this time in ſeveral parts of Shropſhire, with the latch adjoining it made to riſe upon a pivot. The hollow

* It is very material that the iron peg ſhould not reſt cloſe againſt the gate poſt, as that would very much encreaſe the difficulty complained of in opening a gate with theſe faſtenings; the middle part of the head of the gate, as to its thickneſs, is the fitteſt to receive the iron peg, whether it is to be placed high or low, and the play of the catch will be the ſame in all inſtances, provided its ſhouldering is adapted accordingly.

part

part of the latch is in ſhape and ſize like a table ſpoon, with a hole drilled through it to prevent rain lodging there: a ſwing gate with this faſtening is opened either by the hand preſſing down the hollow part of the latch, or on horſe-back you may put a ſtick, or the butt end of a whip into it, and with only one exertion the gate may be thrown open: on the return of the gate, the latch ſtrikes againſt the lower part of one of the catches, either of which will riſe upon its reſpective pivot, till obſtructed by an iron pin or ſtud, placed near the centre of the iron work. Theſe drop catches are thinner at their upper parts than they are downwards, which aſſiſts the latch in riſing clear of them; and when the gate is faſtened the latch is at reſt between the two drop catches. This is not a very eaſy faſtening to deſcribe, and it might be proper to be more particular were it not for the preference due to other contrivances.

A guard muſt be adapted for ſuch a latch, or cattle would be likely to open it; but this faſtening is particularly liable to be out of order, either by the ſinking or the contraction of the gate: every objection might be more eaſily removed than the effects of the gate's ſinking, and to this I have made

made a ſlight improvement, as in the plate; that is, when the latch has ſunk lower than the catches, it will ſtrike againſt an inclined plane, and have a chance of riſing upon its pivot to overcome the obſtacle.

But I have lately received a catch for a gate, from Leiceſterſhire, which though it poſſeſſes a great likeneſs to K, plate I, has one material advantage; that is, that it confines the latch when the gate is at reſt, by a full inch and a half within a narrower compaſs, or allows it ſo much leſs play, which was very deſirable.

This pattern of a ſingle catch admitted of a ſmall improvement, and it was eaſily adapted alſo to a double catch: with reſpect to their uſe, what has been ſaid in regard to K, plate I, and D, and G, plate II, will properly apply to theſe catches.

The ſingle catch is repreſented A, plate IV, and the double catch B, and C, plate IV, which are entitled to a moſt decided preference, compared with any that I have ever met with. Beſides the handle of the ſingle catch riſes almoſt perpendicularly, and therefore does not interfere with the

the hand in performing its double office of opening the gate, and holding up the catch at the ſame inſtant: whereas the handle of the catch K, plate I, muſt be brought much forwarder in lifting it up, than that of the catch A, plate IV; and this, added to the difference in the play of the gate, will make altogether about three inches, which is a great deal in the ſpan of a hand.

There is an objection which attaches equally to theſe kind of catches, as to others, that they may eaſily be broken off a poſt, and carried away; and to obviate this, I confeſs myſelf incompetent to adviſe any certain mode of ſecuring them; but I ſubmit, that where ſuch depredations have been experienced, there will ingenuity moſt likely be found to counteract them.

I have often met with a ſort of puzzle chain G, plate IV, that might be uſed advantageouſly, but why not prefer a padlock in ſuch caſes?

There are many inventions of ſpring catches and latches, the common ſorts of which are very liable to be out of repair, by being conſtantly ex-

poſed to the weather; and thoſe of a ſuperior kind are too expenſive for general purpoſes.

D, plate III, is a hook and ring for holding a horſe by the bridle or halter, and though very generally known and adopted, it cannot be too ſtrongly recommended: a ſtable yard ſhould be well furniſhed with ſuch hooks, to prevent the uſe of common nails, which are extremly dangerous;* and one of them may occaſionally become an uſeful appendage to a gate or wicket. E, plate III, is a haſp with a hook rivetted to it, uſeful for fold-yard gates, pig-ſties, dog kennels, and ſuch like.

* I had a valuable horſe that cut out one of his eyes with a nail, in rubbing his head againſt a wall in my ſtable yard.

CHAP. V.

Conſtruction of Gates, Wickets, and Fences.

C, and F, plate I, are parts of a field gate, ſuch as are in common uſe in this part of Shropſhire, weighing about 130lbs. without the iron work, and its dimenſions are as follow:

	Inches	by	Inches.
Heel	5	..	4
Head	$2\frac{3}{4}$	..	$2\frac{3}{4}$
Rail near the heel	$3\frac{3}{4}$	..	3
Ditto near the head	3	..	$2\frac{1}{2}$
Bars near the heel	$3\frac{3}{4}$	..	1
Ditto near the head	$2\frac{3}{4}$	..	$0\frac{3}{4}$
One diagonal, and two perpendicular bars or lacings, each	$3\frac{3}{4}$	..	1

The diagonal bar riſing from the lower part of the heel of the gate meets the middle of the rail, and the two upright bars are placed at proper diſtances between the middle and the head of the gate: theſe croſs bars muſt aſſiſt very much in keeping the gate together, but what is moſt to be guarded againſt is its ſinking at the head, and to prevent which the gate F, plate IV, is well contrived.

The rail and the horizontal bars of this gate are fimilar to thoſe above deſcribed; but the diagonal bar *c* is let into the lower part of the heel *a*, with a firm reſt or butment, its upper end coming exactly into the angle formed by the rail *f*, and the head *b*; and it is alſo ſupported in its place by the upright bars *d* and *e*: from this arrangement it would ſeem that the bar *c* was likely to puſh the head *b* out of its place, were it not counteracted by the upper thimble being attached to, or forming one end of a flat bar of iron, which paſſing through the heel and along the top of the rail, extends to the head of the gate, having been hammered into an equal width and thickneſs at the part which goes through the head, and is finiſhed at the end with a ſcrew and nut: the iron bar is fixed to the rail with five or ſix ſtrong nails, that ſecure the whole; and this appears to be much more likely to anſwer the purpoſe wiſhed for, than any other plan I have ever met with.

A gate of this kind has juſt been made for me by the direction of an ingenious mechanick: I cannot anſwer for its merits, but am aſſured, that it has been tried with great ſucceſs. The weight of the iron ſtrap or bar is 12lbs. which, at 5d. per lb. and 2d. for the ſcrew nut, coſt 5s. 2d; but I queſtion

tion whether a much lighter bar, even ſo ſmall as half the weight of the above, would not be found to anſwer, if that of 12lbs. weight might be thought too expenſive: the bars *c d e*, F, plate IV, are $3\frac{1}{2}$ inches by $1\frac{1}{8}$, or a full inch.

Gates of an ornamental kind are next to be conſidered, and I do not know a better one than A, plate III; though it is ſtrange that the heel and head, as well as the top, bottom, and ſemicircular rails are all of the ſame dimenſions, preſenting $2\frac{1}{4}$ inches to the eye, by $2\frac{1}{2}$ inches in thickneſs; the upright bars being each a ſquare inch in ſubſtance, and 5 inches aſunder: this gate ſeems to require ſtrap hinges, as repreſented F, plate III. But in every ornamental gate of a larger deſcription, though E, plate II, is a very neat pattern,* I would recommend the bars *c d e*, F, plate IV, to form a part, and conſequently the ſtrap of iron to keep the head in its place;† or if the head were thought to be the only part of ſuch a gate which would be likely to give

* There are four upright bars or lacings belonging to the gate E, plate II, which are round like the horizontal bars, but not quite ſo large.

† This ſtrap of iron muſt have a hole made in it for the handle of the jointed latch, when that faſtening is intended for the gate.

way

way, that might be confined to the rail by a much more ſimple contrivance.

I ſhall now mention a few ornamental fences which are in ſome meaſure connected with this ſubject, and ſuch as appear to be well adapted for their reſpective purpoſes.

In K, plate IV, every length conſiſts of a poſt, nine feet of chain, two ſmaller poſts, three 9-feet lengths of wire, or nail rod iron, and one ſtaple. Having juſt put new oak into a fence of this ſort, which had been fairly worn out, I feel myſelf confident in recommending certain dimenſions for each part, to be cloſely followed by thoſe who may approve of the fence in other reſpects.

	Feet.	Inches.	
Large poſts* . . .	3	4	long
Ditto near the ground .	0	6	diameter
Ditto near the top . .	0	4	ditto
Small poſts . . .	2	4	long
Ditto near the ground .	0	$3\frac{1}{2}$	diameter

* Theſe poſts, as well as the ſmall ones, are ſawed into a ſquare form, the corners of which are taken off, and the tops rounded.

Ditto

	Feet.	Inches.	
Ditto near the top . .	0	$2\frac{1}{2}$	ditto
Size of wire . . .	0	$\frac{3}{8}$	ditto
From the ground to the loweſt wire	0	9	diſtance
Between the other wires .	0	8	ditto

	lb.	oz.	d.	
Weight of chain per yard .	1	11	6	per lb.
Ditto wire ditto . .	1	0	8	ditto
Ditto nail rod iron, rounded	1	0	6	ditto
Ditto ditto, not rounded .	1	0	4	ditto

I cannot anſwer for the wear of the nail rod iron, as the fence alluded to is made of wire; but had I occaſion to put up an entirely new fence of this kind, I ſhould not heſitate in ordering the rounded nail rod iron, if the blackſmith would engage to ſelect ſuch as was perfectly ſound, and to join and round it in a workmanlike manner.

But where a fence for large cattle only is wanting, the poſts and chain alone might be ſufficient, and 8 feet lengths would be better than 9 feet; particularly ſo, if a fence ſhould be wanting occaſionally for ſheep, ſomething ſimilar to one that I have ſeen, as thus: a ſtrong oak bar or board 4 inches by $1\frac{1}{2}$ inch, and $7\frac{1}{2}$ feet long; with upright bars or pales of 2 inches by $\frac{1}{2}$ an inch, 2 feet high, about 3 inches aſunder, and ſharpened at the top as at H,

plate

plate IV: and by way of fixing theſe ſheep hurdles between the poſts, ſuppoſe 2 ſmall ſtaples (like thoſe uſed with braſs rods for ſtair carpets, but made ſufficiently ſtrong,) were ſcrewed into every end of the oak bars, the ſame number of ſcrew ſtaples being attached to the poſts, ſo that every ſheep hurdle would have 4 points of faſtening, for which wire or ſmall cord might be uſed, and afterwards painted or tarred to preſerve it from the weather.

I uſually put on a coat of common coal tar round the part of a poſt, for a foot or more from where it is to be even with the ground, as I have always found, that a poſt fails firſt at or juſt below the ſurface of the ground. I have lately uſed the "Inviſible Green Coal Tar Paint," prepared at the "Britiſh Colour Manufactory," for ornamental fences, which I think is a good colour, as well as a cheap and effectual preſervative of the wood and iron; and, having it ready at hand, any repairs may be immediately coloured to match the old fence.

Nevertheleſs all road gates and gate poſts ſhould be painted white, otherwiſe they will be frequently broken in dark nights by horſes and carriages being run againſt them; eſpecially if this "green" paint were

were to be uſed, which in the dark may be truly called "*invisible.*"*

I had occaſion lately to ſuperintend the making of above 900 yards of the fence L, plate IV, for partitioning off the lawn in my own occupation, which, under ſimilar circumſtances, I would ſtrongly recommend. The intention was at firſt to have had a poſt and rail fence, with hurdles, when good hurdles ſuch as M, plate IV, were worth 40s. per dozen, excluſive of carriage; and as each hurdle meaſured eight feet in length, one would exactly have ſupplied the place of three larch bars, and one oak lacing, which, including timber, workmanſhip, mortiſing the poſts, nails, &c. were of conſiderably leſs value than hurdles, though the comparative ſtrength and durability† muſt be greatly in favour

* If the gate poſts only were to be painted white, they may mark out the road very well, but the gate would become ſtill more endangered, as in the dark it might be ſuppoſed that there was no gate at all.

† Some larch timber was cut down about eleven years ago, in the winter, by a gentleman of this neighbourhood, and was converted into pales for a fence which is now ſtanding, (4th Nov. 1801,) by the ſide of a turnpike road, and perfectly ſound. The pales were nailed to the bars rough from the hands of the ſawyers, and never were painted, nor prepared in any manner to defend them from the weather.

of L, plate IV; and the following are the dimenſions of this fence:

	Inches.		Inches.
Sawed front* of larch rail tapering, from	5	to	3
Hewn or cleft oak poſt, preſenting to the front . . from	4	..	3
Ditto thick . . . from	6	..	5
Size of larch bars . . .	$3\frac{1}{2}$	by	$1\frac{1}{4}$
Ditto oak lacing . . .	4	..	$1\frac{1}{2}$

The preſent fence takes four bars beſides the rail, being one more than was neceſſary, on account of crooked timber having been uſed at firſt, to a great diſadvantage; as the largeſt and ſtraighteſt buts are moſt ſuitable for ſawing into bars.

The rails are made out of the tops of larches, which, after cutting off the ſmalleſt part, will commonly furniſh a 9-feet length to be ſawed once longitudinally for two rails, and a ſecond to be made into four rails, by two cuts of the ſaw biſecting each other at right angles.

The oak lacings were of good ſound timber, and ſharpened at one end for being driven into the ground.

* The ſawed front of the rail is faced about in the plate, which was not intended.

I eſtimate

I eſtimate the value of the timber for this fence to be about equal to the workmanſhip,* nails, putting up, &c. and the whole together, excluſive of carriage, will amount to about 1s. 9d. per yard, running meaſure. But the great advantage of this fence was that of having the particular kinds of timber upon the ſpot, and where there was no oak, which would cleave into rails and bars; for probably under ſuch circumſtances only, would it be adviſable to adopt a cloſe imitation of it.†

The hurdles M, plate IV, are very ſtout, and average in weight about half the long cwt. or 56lbs.

* The rough edges of the rails, bars, and lacings, were finiſhed off with a drawing knife; and the poſts were rounded at their tops, and ſhaved into form.

† It has been thought, that the larch bars would decay at their ends by the rain lodging in the mortiſes; to obviate which, they might as well be nailed to the front of the poſts: the ends of each bar may be ſpliced diagonally to fit thoſe adjoining; and, being let into the front of the poſts, will be firmly ſecured by one nail at each end; the lacings would ſtill be in front of the rails, though behind the bars, and of courſe nailed to the rails and bars, as in L, plate IV.

Thoſe bars, which are made of Scotch fir, are found to be knotty and brittle, and much inferior to the larch.

Both Scotch fir and larch are out of repute for poſts, as they are ſaid to rot very ſoon juſt below the ground.

 a piece:

a piece: the common method of driving the heads of hurdles a foot into the ground, even when their tops are ſtrengthened with an iron hoop ring, ſeems to bear no compariſon to that of having the hurdle heads made without ſtakes, or with very ſhort ones, ſuch as will not require more than the weight of a man's foot upon the lower bar near each of the heads to fix them; being ſupported by a ſtrong ſtake between every hurdle: for the heads of hurdles are very apt to ſplit at the mortiſes in driving them into the ground, in ſpite of every precaution.*

The

* Some oak branches, which had been ſet aſide for burning, were cloven into ſtakes, four feet long, two and a half by two inches thick, and a hole was bored through them with an half inch *brace centre bit*, about ſix inches from the top.

The ſtakes of the hurdles M, plate IV, were cut off to ſeven inches below the undermoſt rail, pointed a little at the ends, and the hurdles fixed by the weight only of a man's foot near each head: the ſtakes being alſo pointed, and furniſhed with iron hoop rings, were driven into the ground, till their holes became oppoſite to the upper edges of the ſecond bars from the tops of the hurdles, when each ſtake was faſtened with about five feet of ſmall tarred cord to the two adjoining hurdles; the cords being doubled round the heads of the hurdles juſt above the ſecond bars, and twiſted four-fold through the holes of the ſtakes, were divided again, and doubled round the correſponding parts of the

oppoſite

The manner of making rails to lap over each other, and faſtening them with a wooden peg or a nail on both ſides of the poſts, inſtead of through the middle of them, (as deſcribed N, plate IV, each peg or nail paſſing through both the adjoining rails) ſeems to deſerve the recommendation with which I received it; as the reſiſtance oppoſed to any force from cattle, being thus made to co-operate with the grain of the wood, becomes conſiderably encreaſed, and muſt neceſſarily contribute to the ſtrength of ſuch a fence.

oppoſite hurdles; and the knots being completed, a blow or two upon the ſtakes tightened the whole, inſomuch that if the hurdles had had no ſtakes at all (which indeed was the caſe with ſome of mine) they could not have been diſplaced by any cattle whatever.

The ſtakes, when driven in as far as is neceſſary, have about 16 inches in the ground, and two feet eight inches above it, which may be 6 or 8 inches ſhorter than the hurdles; though it might be as well if the ſtakes could be cut long enough to faſten the cords round the top parts of the hurdle heads, above the uppermoſt bars.

The tarred cords coſt ſixpence per lb. of 88 feet, or 5s. 6d. for 11lbs. which amounts only to about ½d for each faſtening.

CHAP. VI.

Proposals for furnishing the iron-work of Gates and Wickets, as herein recommended, by Samuel Lawrence, of Shifnal.

ALL letters of orders muſt be ſent, *post paid*, or delivered free of expence to Samuel Lawrence, containing money to the amount of the goods ordered,* and proper directions for forwarding them, with the ſurplus in exchange for a note or other money received, which will be faithfully returned.

The goods ſhall be finiſhed in a workman-like† manner, and the orders executed according to the rotation in which they are received, and charged as follows:

* As Mr. Lawrence's buſineſs is confined to his own neighbourhood, were he to allow debts to be contracted by ſtrangers, who may live at a great diſtance, he muſt have calculated upon loſſes, and perhaps doubled his charges; but I would adviſe him by no means to work upon any ſuch terms.

† Specimens of which are ſent to the "Board of Agriculture," &c. (ſee page 18.)

No. I.

	lbs.	oz.*	s.	d.
Complete set of hangings for a gate to open one way; consisting of B, D, I, and G, plate I, with washer and cotter, . .	8	12	5	10

No. II.

Ditto for a swing gate, consisting of B, D, I, plate I, and N, plate II, with washer and cotter, . .	9	0	6	0

No. III.

Single catch A, plate IV, with the handle or ring, adapted for the iron peg latch,	1	0	1	4

No. IV.

Ditto without the handle or ring, adapted to the jointed latch, ...	1	0	1	4

No. V.

Double catch, B, plate IV, .	1	12	2	6

No. VI.

† Jointed latch consisting of H, I, K, L, M, O, and P, plate II, with pivot and rivet pins, and twenty screws complete,	2	8	3	0

No. VII.

* It must be understood that a good standard weight is mentioned to prevent any material variation therefrom, though it cannot be expected to be preserved with unnecessary exactness.

† Every order for a jointed latch ought to be accompanied with the following particulars, as to the dimensions of the gate for

No. VII.

	lbs.	oz.	s.	d.
Plain iron peg latch, E, plate I,	0	6	0	5

No. VIII.

Ditto with a guard and nails complete A, plate II,	0	15	0	10

No. IX.

Iron peg latch with screw nut,	0	6	0	7

No. X.

Ditto with a guard and nails complete B, plate II,	0	15	1	0

No. XI.

Complete set of hangings for a wicket to open one way, with washer and cotter,	3	8	2	8

for which it shall be intended, that the iron work may be made to fit exactly.

	Feet.	Inches.
Length of the gate		
Height of ditto		
Thickness of the head, through which the latch is to pass		
Ditto of the rail, through which the handle of the latch is to pass		
Distance between the rail and the nearest horizontal bar; or as in the instance E plate II, the distance between the two horizontal bars adjoining the latch		
Ditto between the head and the adjoining perpendicular bar, as in the instance A plate III.		

And lastly, whether the gate is to swing, or to open only one way.

And

And to be more precise,* I add the following extract from the above, by way of facilitating any order, which will be a sufficient guide to Mr. Lawrence, that is:

	s.	d.
For a carriage road gate to open one way, Nos. 1, 4, and 6, . .	10	2
For a swing gate, Nos. 2, 5, and 6, . . .	11	9
For a common road gate, Nos. 1, 3, and 8, ...	8	0

	£.	s.	d.
For a fold-yard or field gate, Nos. 1, 3, and 10, ...	0	8	2
For a wicket, Nos. 3†, 8, and 11, . .	0	4	10
Or, Nos. 4, 6, and 11, ...	0	7	0
Box, packing, and booking for any order not exceeding 12s. . .	0	1	0
And for every additional shilling, . .	0	0	1
‡ Large wicket with hangings and fastenings put on complete (about 45lbs.)	1	2	0

I shall

* Persons living within a moderate distance, who may wish to have their gates hung in the manner described, I would recommend to employ William Bucknal, (joiner,) of Shifnal, who has been working under my directions in all the experiments from which this essay has resulted.

† Though the hangings for wickets are less than half the weight of those for gates, their fastenings will admit of being reduced but little or nothing.

‡ Made of the best English oak, about five feet ten inches long, by three feet three inches high, one rail, three bars, and lacings,

I ſhall now cloſe theſe pages with a requeſt that none of my friends will apply to me in this buſineſs, through any other medium, or in any other manner, than ſuch as I have pointed out, that is, to "*Mr. Samuel Lawrence, blacksmith, Shifnal, Shropshire.*" It being very uncertain to what extent applications might be made, I am obliged to decline them altogether; yet it is my intention, to ſee that orders as above are executed in a proper manner, as far as I can make it convenient.*

ſimilar to the gate F, plate IV; the whole put together with one inch and an half wood-ſcrews, 32lbs. iron ſtrap fixed to the top bar with one inch and an half wood-ſcrews, jointed latch put on, packing, booking, &c. 12s.

Iron work, Nos. 4, 6, and 11, with ſtrap or bar for the rail, 12lbs. 4 ozs. 10s.

* I would wiſh equally to avoid intruding an apology unneceſſarily, as to appear inſenſible to the defects of this production: but I muſt aſſure my readers, that either by their pointing out errors into which I have been miſled, or by ſuggeſting improvements that might add to, or even ſuperſede theſe hints, I ſhould conſider myſelf moſt particularly obliged.

HATTON GRANGE,
10th Nov. 1801.

FINIS.

NOTE to Page 10.

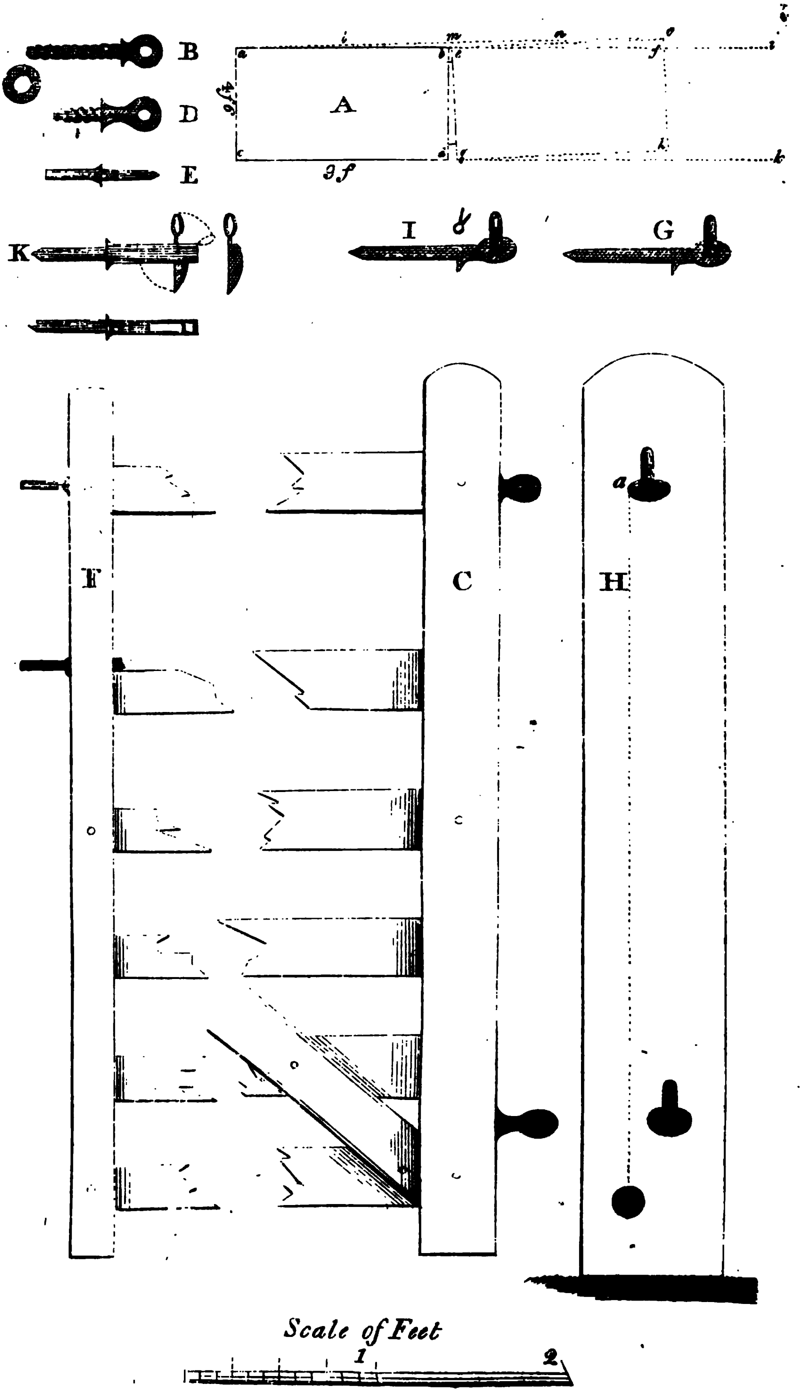
It does not appear to be of any conſequence, whether the lower thimble is placed a few inches nearer to or farther from the upper one, provided the pair of thimbles are proportionably different in their lengths; and it may therefore be convenient ſometimes to make their diſtance from each other ſubſervient to the difference of their lengths, that is; as $1\frac{3}{12} : 36 : : 1\frac{4}{12} : 40$; or as $1\frac{3}{12} : 36 : : \frac{9}{12} : 20$; for example; if a waſher of $1\frac{1}{12}$ inch is wanting, the thimbles being put on 3 inches nearer to each other would ſupply the deficiency, becauſe as $1\frac{3}{12} : 36 : : \frac{1}{12} : 3$; or by letting the upper thimble into the heel of the gate $\frac{1}{12}$ inch, it would anſwer the ſame purpoſe: and the lower thimble might be let into the heel of the gate, as occaſion required, to produce a contrary effect.

ERRATA.

Page 7	Line 6,	for	its,	read	the
10	—— 23,	—	36,	——	30.
12	—— 4,	dele, or *vice verſâ*.			
15	—— 23,	—	will,	——	muſt
16	—— 1,	—	upon,	——	from
	—— 18,	—	counteract,	read	overcome
18	—— 10,	—	Royal Inſtitution,	read	"Royal Inſtitution";
20	—— 1,	—	the,	——	too
21	—— 17,	—	about 5 inches,	read	5 inches
23	—— 8,	dele there will be			
26	—— 12,	—	as by,	read	in
28	—— 24,	—	rounded and bevelled,	read	bevelled or *coned*
29	—— 3,	—	and the ſocket is,	read	the ſocket being.

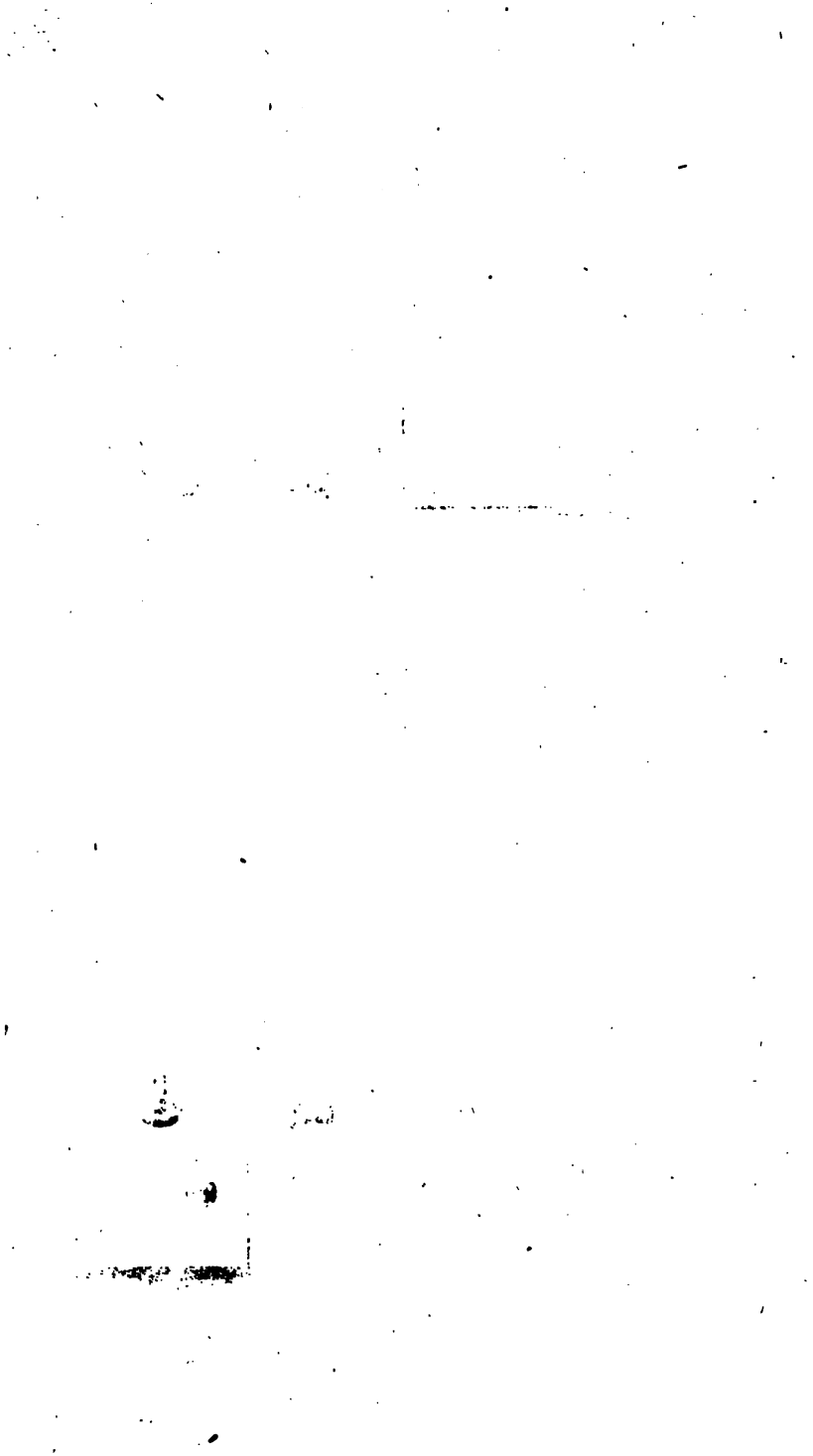
Printed by J. WHITING, Finsbury Place, London.

Pl I

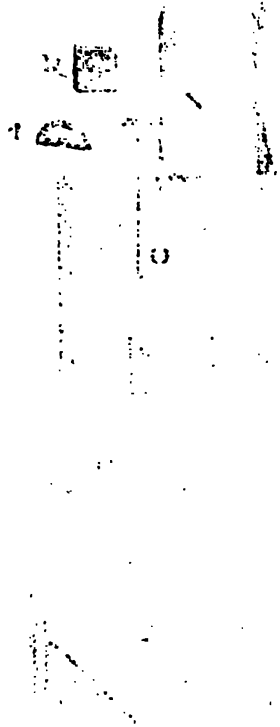


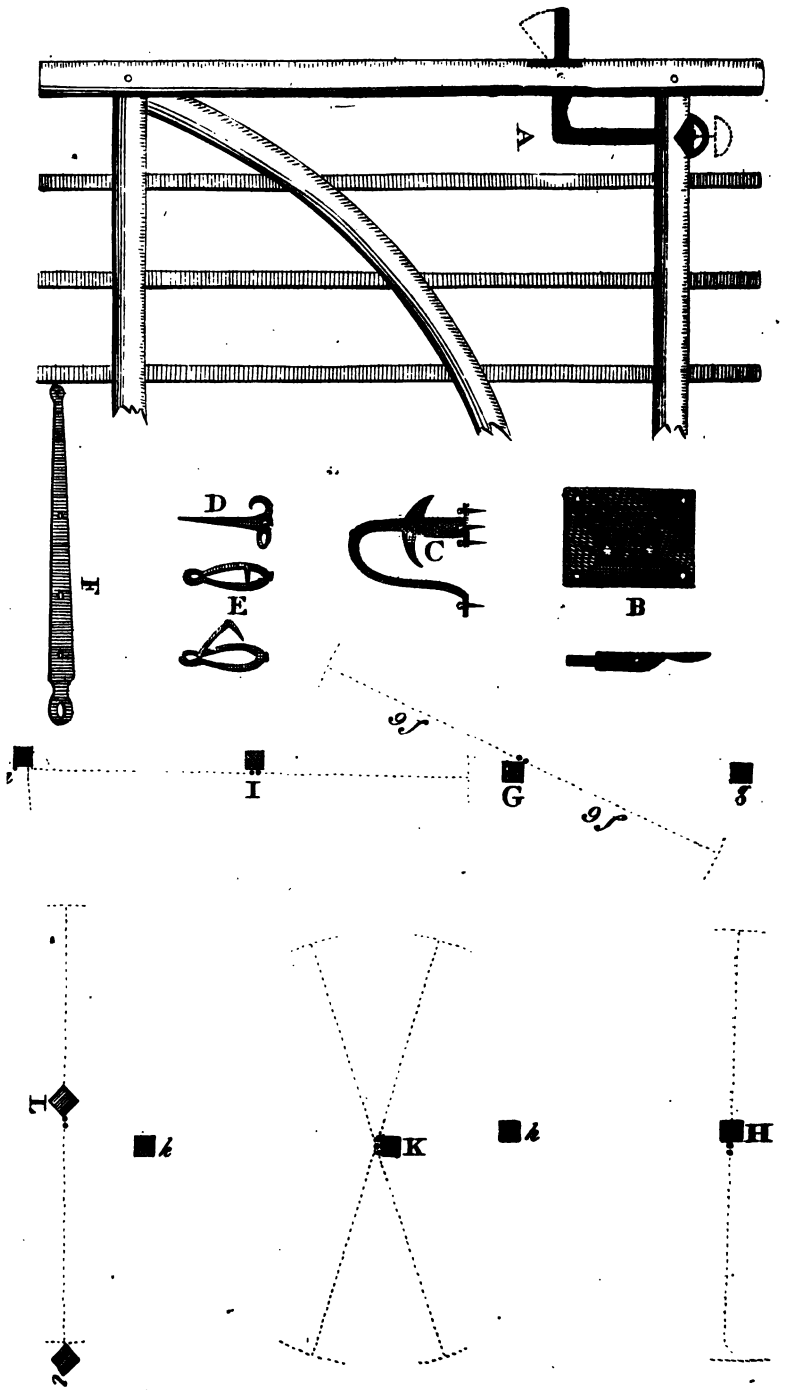
Th. N. Parker Esq.r Design.

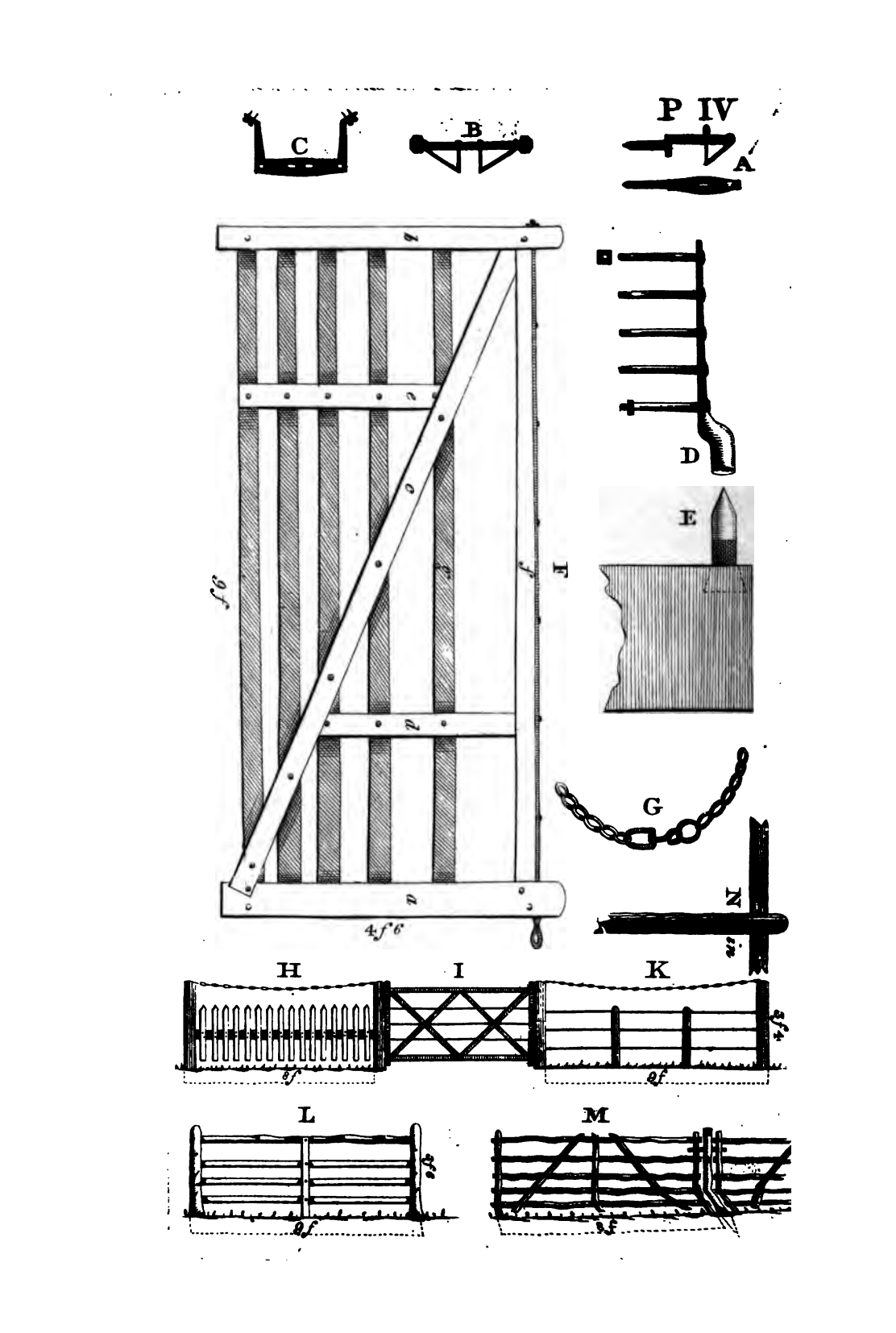
Rowley Salop Sc



A
B
C
D
E
F
a
G
H
I
K
L
M
N
O
P




A
D
E
F
C
B
I
G
H
K
L


P IV
A
B
C
D
E
F
G
H
I
K
L
M
N
4f 6
6f
8f
9f